WHAT IS CLAIMED IS:

1. An optical receiver comprising:

a vertical lasing semiconductor optical amplifier (VLSOA) comprising:

a semiconductor active region;

an amplifying path traversing the semiconductor active region; and

a laser cavity including the semiconductor active region, wherein the laser cavity is oriented vertically with respect to the amplifying path and pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value; and

a photodetector coupled to the VLSOA.

2. The optical receiver of claim 1 wherein the photodetector is selected from a group consisting of a PIN diode and an avalanche photodiode.

3. The optical receiver of claim 1 further comprising:

an optical fiber coupling the VLSOA to the photodetector, wherein the VLSOA and the photodetector are discrete components.

4. The optical receiver of claim 1 wherein the VLSOA and the photodetector are integrated onto a common substrate.

5. The optical receiver of claim 4 wherein the VLSOA is directly coupled to the photodetector.

6. The optical receiver of claim 4 wherein:

the photodetector comprises an active region; and

the semiconductor active region of the VLSOA transitions into the active region of the photodetector.

7. The optical receiver of claim 6 wherein:

the VLSOA further comprises a bottom cladding layer and a top cladding layer;

the photodetector further comprises a bottom cladding layer and a top cladding layer;

the bottom cladding layer of the VLSOA transitions into the bottom cladding layer of the photodetector; and

the top cladding layer of the VLSOA transitions into the top cladding layer of the photodetector.

8. The optical receiver of claim 4 further comprising:

an optical waveguide coupling the VLSOA to the photodetector, wherein the optical waveguide is also integrated onto the common substrate.

9. The optical receiver of claim 8 wherein:

the optical waveguide comprises a core;

the photodetector comprises an active region; and

the semiconductor active region of the VLSOA transitions into the core of the optical waveguide, which transitions into the active region of the photodetector.

10. The optical receiver of claim 4 wherein:

the photodetector comprises an active region; and

the semiconductor active region of the VLSOA and the active region of the photodetector are based on a common structure which has been altered so that the semiconductor active region of the VLSOA has a different transition energy than the active region of the photodetector.

11. The optical receiver of claim 4 wherein:

the photodetector comprises an active region; and

the semiconductor active region of the VLSOA and the active region of the photodetector have a same structure but are electrically biased differently so that the

semiconductor active region of the VLSOA has a different transition energy than the active region of the photodetector.

12. The optical receiver of claim 4 wherein the common substrate is an InP substrate.

13. The optical receiver of claim 4 wherein the optical receiver operates at a wavelength between 1.3 micron and 1.7 micron.

14. The optical receiver of claim 4 wherein the optical receiver is capable of detecting data at a data rate of at least 10 Gbps.

15. The optical receiver of claim 1 further comprising:

at least one additional photodetector; and

an optical splitter coupling the VLSOA to the photodetectors.

16. The optical receiver of claim 15 further comprising:

a semiconductor optical amplifier coupling the optical splitter to one of the photodetectors.

17. The optical receiver of claim 15 further comprising:

a plurality of optical amplifiers coupling the optical splitter to the photodetectors for equalizing optical signals received by the photodetectors.

18. The optical receiver of claim 15 wherein the VLSOA, the optical splitter and the photodetectors are integrated onto a common substrate.

19. The optical receiver of claim 15 wherein the optical splitter comprises a wavelength division demultiplexer.

20. The optical receiver of claim 15 wherein the optical splitter comprises an arrayed waveguide grating.

21. The optical receiver of claim 1 further comprising:

a feedback loop between the photodetector and the VLSOA for adjusting the substantially constant value.

22. The optical receiver of claim 1 wherein the photodetector is coupled to receive a ballast laser signal from the laser cavity of the VLSOA.

23. The optical receiver of claim 22 wherein the photodetector is vertically integrated with the VLSOA.

24. The optical receiver of claim 23 further comprising:

an optical filter vertically integrated between the VLSOA and the photodetector.

25. An optical receiver comprising:

a gain-clamped semiconductor optical amplifier comprising:

a semiconductor active region;

an amplifying path traversing the semiconductor active region; and

a laser cavity including the semiconductor active region, wherein pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value; and

a photodetector coupled to receive a ballast laser signal from the laser cavity of the gain-clamped semiconductor optical amplifier.

26. The optical receiver of claim 25 wherein the laser cavity is oriented transversely with respect to the amplifying path.

27. The optical receiver of claim 25 wherein the laser cavity is oriented longitudinally with respect to the amplifying path.

28. The optical receiver of claim 25 further comprising:

an optical filter located between the gain-clamped semiconductor optical amplifier and the photodetector.

29. The optical receiver of claim 25 further comprising:

a feedback loop between the photodetector and the gain-clamped semiconductor optical amplifier for adjusting the substantially constant value.